



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/083,454	02/25/2002	Kenneth A. Peterson	SD-7121	8436

7590 02/11/2003

Timothy D. Stanley
Sandia National Laboratories
P. O. Box 5800 - MS-0161
Albuquerque, NM 87185-0161

[REDACTED] EXAMINER

THAI, LUAN C

[REDACTED] ART UNIT [REDACTED] PAPER NUMBER

2827

DATE MAILED: 02/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/083,454	PETERSON ET AL.
	Examiner	Art Unit
	Luan Thai	2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 05 December 2002.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-64 is/are pending in the application.
- 4a) Of the above claim(s) 29-41 and 43-64 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-28 is/are rejected.
- 7) Claim(s) 42 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____.
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> .	6) <input type="checkbox"/> Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election of Embodiment I of Figures 10A-10D and Figures 14A-14C, claims 1-30 and 42, in Paper No. 6 is acknowledged. However, claim 30 that recites the first electrical device being TAB bonded to the electrical lead (as shown in figure 21) is not read on the elected Embodiment II of Fig. 16, which discloses the first electrical device being flip-chip connected to the electrical lead. Therefore, not only non-elected claims 31-41 and 43-46 but also claim 30 and claim 29 (depending on claim 30) are withdrawn from consideration as being directed to a non-elected species.

Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Information Disclosure Statement

1. The information disclosure statement (IDS) filed on 02/25/02 has been considered by the examiner.

Oath/Declaration

2. The declaration filed 02/25/02 is acceptable.

Claim Objections

3. Claims **3, 20, 21** and **42** are objected to because of the following informalities:
 - a) The recitations "the at least one electrical conductor" in claim **3**, should be changed to --said first electrical conductor--.

b) In claim **42**, the preamble "The package of claim 1" should be changed to –

The package of claim 23—since the limitation "the first microelectronic device" is firstly recited in claim 23, not in claim 1.

C) In claim **20** and claim **21**, the recitations "temperature from about 600 C to about 1000 C" and "temperature from about 1300 C to about 1800 C" should be changed to -- temperature from about 600° C to about 1000° C-- and -- temperature from about 1300° C to about 1800° C--, respectively.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

4. Claims 1, 3, 4, 8, 23, 25, and 27 are rejected under U.S.C. 102(e) as being anticipated by Stern et al (6,147,389).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 1, 3, 4, 8, 23, 25, and 27, Stern et al (see specifically figure 7A) disclose a package with an integral window for housing a microelectronic device comprising: an electrically insulating plate 701 having a first surface, an opposing second surface, and an aperture disclosed through the

plate; a first electrical conductor 704 (e.g., thick-film metallized trace, electrical lead) disposed on the second surface of the plate 701; an integral window 302 disposed on the first surface of the plate 701 and extended laterally along the first surface a sufficient distance beyond the periphery of the aperture to provide a sufficiently large overlapping area and high bond strength, wherein no separate layer of adhesive material is disposed in-between the window 302 and the plate 701. Stern et al further disclose a first microelectronic device 306 (e.g., image sensor chip), which comprises a light-sensitive side facing the window, flip-chip interconnected to the first electrical conductor 704 via conductive ball 703 (Col. 6, lines 30+).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
5. Claims 13, 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stern et al (6,147,389) in view of Glenn (5,867,368).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 13, Stern et al disclose all the limitations of the claimed invention as detailed above except for the material (e.g., glass, clear plastic, clear polymer, or sapphire) making of the window.

However, glass, clear plastic, clear polymer, or sapphire, are well-known materials in optical device art for forming a window, as disclosed by Glenn (Col. 5, lines 30+).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use glass for forming the window in Stern et al's device, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claims 26 and 28, Stern et al disclose all the limitations of the claimed invention as detailed above except for a polymer underfill encapsulating the flip-chip interconnections disposed in-between the device and the plate.

Glenn while related to a similar optical structure design teaches (see specifically figures 1 and 5) the polymer underfill 22 encapsulating the flip-chip interconnections 15 and forming a continuous ring seal disposed in-between the microelectronic device 10 and the plate 16 in order to improve the bonding strength of the flip-chip connections and seal the aperture covered the optical element. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Glenn's teachings to the package of Stern et al in order to improve the bonding strength of the flip-chip electrical interconnections and seal the aperture covered the optical element.

6. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stern et al (6,147,389) in view of Billingsley et al (4,421,985).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 14-15, Stern et al disclose all the limitations of the claimed invention as detailed above except for the window comprising silicon, calcium fluoride, germanium, or germanium fluoride.

However, silicon, calcium fluoride, germanium, or germanium fluoride, are conventional transparent materials in optical art for providing high reflectance/nonreflectance ratio at any given wavelength in the infrared and at usable ratios in the visible band, as disclosed by Billingsley et al (Col. 4, lines 16+).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the window comprising silicon, calcium fluoride, germanium, or germanium fluoride, for the purpose of providing high reflectance/nonreflectance ratio at any given wavelength, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

7. Claims 2, 19-22, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stern et al (6,147,389) in view of Wetzel (6,011,294).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 2, 19-22, and 24, Stern et al disclose all the limitations of the claimed invention as detailed above except for the electrically insulating plate comprising a multilayered material (e.g., polymer or cofired ceramic multilayered material fired at temperature from about 600° C to about 1000° C or from about 1300° C to about 1800° C).

Polymer or cofired ceramic multilayered material, however, are commonly applied in the art, specifically in optical packaging art, for low cost or low moisture permeability, high dimensional stability, good thermal conductivity, etc., as taught by Wetzel (Col. 2, lines 19+ and Col. 1, lines 9+ and lines 16+, respectively). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use polymer or cofired ceramic multilayered material for forming the insulating plate in Stern et al's device, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

In re Leshin, 125 USPQ 416.

Although the proposed package of Stern et al and Wetzel does not explicitly teach the temperature range of the cofired ceramic multilayered material (e.g., from about 600° C to about 1000° C or from about 1300° C to about 1800° C) as claimed in claims 20-21, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the cofired ceramic multilayered material at the temperature range as claimed since it has been held that discovering an optimum value of a result effective variable

involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stern et al (6,147,389) in view of Zmek (5,233,174).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 18, Stern et al disclose all the limitations of the claimed invention as detailed above except for the window comprising an array of binary optic lenslets.

Zmek while related to a similar optical device package teaches a window of a binary optic lenslets array being used for determining an aberration of an incident wavefront (Col. 2, lines 15+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Zmek's teachings to Stern et al's optical device package for determining an aberration of an incident wavefront, and such application is held to be within the ordinary designing ability expected of a person skilled in the art.

9. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stern et al (6,147,389) in view of Glenn (6,274,927).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 5-7, Stern et al disclose all the limitations of the claimed invention as detailed above except for structural bonding of the window to

insulating plate (e.g., lip recessed, encased joint geometry, self-locking geometry).

The structural bonding of the window to insulating plate such as lip recessed, encased joint geometry, self-locking geometry, are commonly applied in the art, specifically in optical packaging art, as disclosed by Glenn (see figures 12A and 13-19). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Stern et al's optical device package to have the structural bonding of the window to insulating plate as claimed, since such modification is held to be within the ordinary designing ability expected of a person skilled in the art.

10. Claims 9, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stern et al (6,147,389) in view of Nagano (5,357,056 of record).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 9, Stern et al disclose all the limitations of the claimed invention as detailed above except for structural bonding of the window to insulating plate (e.g., substantially filled the aperture).

The structural bonding of the window substantially filled the aperture of the insulating plate, however, is commonly applied in the art, specifically in optical packaging art, as disclosed by Nagano (see figure 1B). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Stern et al's optical package by forming the window substantially filled the

aperture of the insulating plate, since such modification is held to be within the ordinary designing ability expected of a person skilled in the art.

Applicant's claims 10 and 12 do not distinguish over the proposed device package of Stern et al and Nagano regardless of the process used to bond the window to the insulating plate, because only the final product is relevant, not the process of making such as "formed by casting" or "having solidified after casting". Note that a "product by process" claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marrosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 706.03(e).

11. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stern et al (6,147,389).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 16-17, Stern et al disclose all the limitation of the claimed invention as detailed above except for the window comprising an anti-reflection coating (recited in claim 16) and means for filtering selected wavelengths of light (recited in claim 13). A window or transparent having an anti-reflection coating is commonly applied in the optical packaging art for a optical device receiving more light from the outside source. Furthermore, a window comprising means for filtering selected wavelengths of light is also commonly applied in the art for the purpose of preventing the unwanted wavelengths of light being received by the optical device. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the window in Stern et al's optical package by forming the window comprising an anti-reflection coating and means for filtering selected wavelengths of light in order to get the only selected wavelengths of light and to prevent the unwanted wavelengths of light coming to the optical device.

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stern et al (6,147,389) and Nagano (5,357,056 of record), as applied to claim 10 above, and further in view of Glenn (6,117,193).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 11, the proposed package of Stern et al and Nagano discloses all the limitations of the claimed invention as detailed above except for the shape of the window (e.g., a convex outer shape).

A window having a convex outer shape, however, is commonly used in the optical packaging art, as taught by Glenn (e.g., window 3 in figures 6-7) for concentrating light passing through the window. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a convex outer shaped window in the proposed package of Stern et al and Nagano for the purpose of concentrating light passing through the window, and such application is held to be within the ordinary designing ability expected of a person skilled in the art.

Allowable Subject Matter

13. Claim 42 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
14. The following is a statement of reasons for the indication of allowable subject matter.

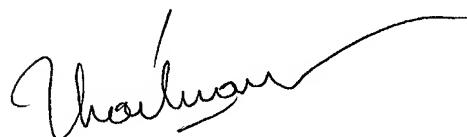
The prior art taken either singly or in combination fails to anticipate or fairly suggest: a printed wiring board for the package mounting on, wherein the board comprises an opening through the board, the aperture in the package being aligned with the opening in the board, thereby allowing light to pass through both the opening and the aperture to interact with the light-sensitive side of the first microelectronic device, as recited by claim 42; especially when these limitations are considered within the specific combination claimed.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is (703) 308-1211.

The examiner can normally be reached on 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Luan Thai
January 20, 2003